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SUMMARY OF WATER QUALITY AND WASTE OUTFALLS, ROCK CREEK IN MONTGOMERY COUNTY, MARYLAND, AND THE DISTRICT OF COLUMBIA

Federal Water Pollution Control Administration
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I. INTRODUCTION

At the request of Secretary Stewart Udall of the Department of the Interior, on July 3, 1966, the Federal Water Pollution Control Administration was requested to make a study of the pollution problems in the Rock Creek Sub-Basin of the Potomac River Basin, and prepare a corrective program to permit water recreation by October 1967. In accordance with this request, the Chesapeake Field Station was directed to make a determination of water quality in Rock Creek and an inventory of waste outfalls.

The cooperation of the following agencies in providing information assisted appreciably in the completion of this investigation:

Maryland-National Capital Park and Planning Commission

Maryland Department of Health

Maryland Department of Water Resources

Montgomery County Department of Health

D. C. Department of Sanitary Engineering

D. C. Department of Public Health

U. S. Geological Survey

II. PHYSICAL DESCRIPTION

Rock Creek drains a watershed area of approximately 77 square miles and has its source south of Laytonsville in Montgomery County, Maryland. It flows generally southerly for a distance of approximately 30 miles, discharging into the Potomac River Estuary. The lower ten stream miles of Rock Creek drain approximately 16 square miles of the highly urban District of Columbia. The urban area can also be considered as extending northerly to Rockville, beyond which the predominately rural agricultural area is rapidly becoming suburban (Map, Figure 5).

The watershed is generally upstream from the geologic Fall Line and located in the Piedmont Zone, which consists of moderately well-drained, rolling country with fairly narrow flood plains. The flood plain in the District of Columbia is protected by park development under the administration of the National Park Service. A program of land acquisition and park development is being carried out along the Montgomery County flood plain by the Maryland-National Capital Park and Planning Commission[1/].

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III. THE STUDY

A. SURVEYS

Data for evaluation of the bacteriological, biological, and other water quality characteristics of the stream were obtained by field surveys and from records of health agencies in the area. The following field investigations were conducted by the Chesapeake Field Station:

1. Bacteriological

A stream survey conducted by the Chesapeake Field Station (CFS) in August 1966, supplemented by earlier sampling during June, were primary sources of coliform bacteria data. In addition, bacteriological records of the D. C. Department of Public Health collected during 1965 provided the remaining source of information. The year 1965 was selected in order to have an annual cycle of data. Comparison of the various sets of data indicate relative agreement.

A moderate storm that occurred during the August sampling period permitted one observation of bacterial concentrations resulting from urban runoff.

Since coliform bacteria are not positive indicators of the presence of human fecal pollution, concentrations of fecal coliforms and fecal streptococci were also determined by the CFS laboratory. The ratio of fecal coliforms to fecal streptococci

(FC/FS) is considered a more valid index for establishing the presence of human excreta. An FC/FS ratio of in excess of 2.5 is generally considered indicative of human pollution[6/].

Coliform densities were compared with Water Quality Sub-Task Force, Project Potomac, standards adopted for water contact recreation which recommend levels of less than 1000 MPN/100 ml at least 50 per cent of the time and less than 2400 MPN/100 ml at least 90 per cent of the time, based on arithmetic averages. (Figure 1, Table 1)

2. Biological

The CFS biologist conducted studies of stream biota to define water quality as measured by type and numbers of genera of bottom organisms. Although not a part of the study, casual observations of fishlife were noted.

Benthic surveys were made at several locations to distinguish between siltation and possible sediment from untreated or partially treated sanitary waste discharges.

3. Waste Outfalls

With the assistance of the D. C. Department of Sanitary Engineering and the Washington Suburban Sanitary Commission, personnel from the CFS located and identified 211 outfalls capable of discharging sewage or storm water into the Rock Creek Watershed. When there were flows from an outfall, both the discharge

and the receiving waters were observed and, where pollution was suspected, samples were taken and analyzed.

4. Surfactants

During the survey period, samples were collected and analyzed for surfactants (detergents) and the data utilized to indicate possible human pollution. Surfactant concentrations greater than 0.5 mg/l are considered presumptive indicators of sanitary waste discharges[7]. A special study was made October 18 to determine detergent levels following a report of extensive foaming in Rock Creek.

5. Nutrients

Analysis for total phosphorus was made over the six-month period of January-June 1966 by CFS using samples collected at the M Street Bridge in Washington, D. C., by the D. C. Department of Public Health (Figure 3). Samples collected during this period were analyzed for both phosphorus and nitrogen (Table 2).

6. Inorganic Solids

Turbidities were determined on October 19, 1966, using samples taken after a three and one-half inch rainfall (Table 3). Suspended solids in District of Columbia reaches of Rock Creek for 1965 are shown in Figure 4.

B. EXISTING POLLUTION ABATEMENT PROGRAMS AND REGULATIONS

A review of current and proposed pollution abatement programs and regulations was made, and a summary is included in this paper.

IV. SUMMARY OF FINDINGS

A. EXTENT AND SOURCES OF POLLUTION

1. Bacteriological

Based upon bacteriological analysis of Chesapeake Field Station samples taken during June and August, no reaches of Rock Creek, from the junction with the Potomac River to the headwaters, meet the Water Quality Sub-Task Force, Project Potomac, criteria for water contact recreation of coliform counts less than 2400 MPN/100 ml at least 90 per cent of the time.

In the lower reaches, high coliform counts are a matter of record, as is indicated by data from the District of Columbia included in this paper (Figure 2). A tabulation of results of Chesapeake Field Station bacteriological analyses (Figure 1 and Table 1) indicates generally high coliform counts in all but the upper reaches of the Basin. In the upper reaches coliform counts are generally low, but consistent.

Sources of pollution in Montgomery County are:

1. Soil erosion and storm runoff in agricultural areas near the headwaters carry fertilizers and animal waste into Rock Creek and increase bacterial levels in the stream.
2. Urban storm runoff pollution has increased as a result of the rapid change from rural to suburban land occupancy in the upper Rock Creek Basin (Map, Figure 5).

3. Montgomery County is served by a separate sewer system, and, in the past, some manholes have overflowed when the capacity of D. C. sewers in the reaches of Rock Creek was exceeded.

In the District of Columbia reaches, the principal sources of pollution were identified as follows:

1. Certain combined sewer outfalls that are subject to overflow during periods of heavy rainfall[3/]
2. Defective or broken sewers
3. National Zoological Park
4. Urban runoff

2. Biological

Findings of the Biological Survey[8/] indicated good water quality in the stream reach from Avery Road to Rockville in Montgomery County. Some degradation was indicated in the reach from Rockville to Viers Mill Road, but general water quality was good. The Viers Mill reach was degraded to fair quality, but recovery with good quality was indicated from Garrett Park to North Chevy Chase.

Evidence of pollution increased as the Rock Creek survey continued downstream to the Potomac. Coquelin Run contributed nitrogen and phosphorus, and Piney Branch contributed a mild organic pollution load to the stream. Sparse clean-water genera at Rock Creek Recreation Center indicated only fair water quality,

while intermediate and pollution-tolerant genera in the reach from Beach Drive to P Street indicated mild pollution.

Slash Run and P Street outfall sewers were contributing organic pollution to Rock Creek. Moderate to heavy pollution was indicated from P Street to the Potomac River. Dominant bottom organisms consisted of intermediate and pollution-tolerant genera. Only one bottom organism was found at the mouth of Rock Creek. Tidal action diffuses salt water into the mouth of the stream, which probably accounted for the lov population of bottom organisms in the area. (Appendix 2)

3. Nutrients

Phosphorus concentrations ranged from 0.15 to 1.0 mg/l; nitrogen concentrations ranged from 0.62 to 1.96 mg/l.

One source of phosphorus is the discharge from sludge control operations in boilers and air-conditioning cooling towers in commercial and larger residential buildings. The chemicals used are principally phosphates for removal of scale-producing compounds, primarily carbonates, from the system. Discharges are made into storm-water drains. Discharges into sanitary sewers are prohibited by the Washington Suburban Sanitary Commission and the District of Columbia.

Coquelin Run, Piney Branch, and the Slash Run Interceptor were found to contribute phosphorus and nitrogen to Rock Creek (Appendix 2).

4. Inorganic Solids

Erosion in the Rock Creek Watershed has resulted in silting of the stream bed and high turbidities, both of which contribute to objectional concentrations of inorganic solids and destroy the aquatic environment needed for the survival and propagation of fishlife. The condition is especially serious in the reaches in Montgomery County where rapid development of residential areas has resulted in exposure of the subsoil to active erosion.

5. Other Wastes

Rapid urbanization of formerly rural areas in Rock Creek Watershed, with the resulting increase of paved and roofed areas, has increased the per cent of runoff as well as causing more erratic discharges in the stream. Storm water from these urban areas transports all types of waste into watercourses.

The presence of large quantities of discarded articles and refuse in the Creek and its tributaries could not be directly related to pollution; however, aside from being esthetically objectional, visible trash and refuse tends to invite others to use the Creek as a general disposal vehicle.

B. STREAM REACH SUMMARY

The following describes briefly, by sections of the Watershed, the conditions found during the field investigations.

Upper Rock Creek, Montgomery County: The reaches north of Rockville are not free of bacterial contamination; however, the concentrations of coliform bacteria did approach levels generally considered acceptable for body contact recreation. Pollution sources appeared to be of animal and agricultural origin and, as such, would not pose serious health hazards in the concentrations found. The biological survey indicated a good quality of water, as evidenced by the numerous schools of minnows and the existence of a balanced population of clean-water aquatic life.

Lower Rock Creek, Montgomery County: Water quality within this portion of the Watershed was found to be somewhat degraded (when compared to the upper rural areas). An increase was observed in coliforms identifiable as originating from warm-blooded animals (possibly humans). The increase in surfactants in the East-West Highway area extending to the District line suggested this pollution was from domestic sources. While the counts are generally low, they are consistent. An attempt to trace out sources of pollution was inconclusive, except that Coquelin Run was a significant contributor. It appears that, since a small part of the Coquelin Run area is served by individual septic tanks, significant seepage from the sub-surface disposal systems may at times reach the watercourse. The biological survey identified variable populations of minnows and suppressed numbers of clean

water genera, and, when compared with the bacteriological results, suggested only fair water quality in this reach.

Upper Rock Creek, District of Columbia: In general, the lower coliform counts, as exhibited in Table 1, suggest this reach as one of recovery, especially between Sherrill Drive and Pierce's Mill. A large sewer outfall at Klingle Road, presumably plugged and out of service, had a small discharge into a pool that was turbid and discharging gas bubbles with a characteristic sewage odor, suggesting that septic action was taking place. A discharge with a distinct sewage odor was also observed entering Broad Branch at Albemarle and 32nd Streets. Oil seepage from the ground, noticed on the east side of Connecticut Avenue just north of 3701, was assumed to originate from an apartment house heating plant. The oil was transported by a spring-fed tributary to Rock Creek.

A broken or leaking sewer crosses Broad Branch behind the shopping center at 4400 Connecticut Avenue and was discharging at a low rate directly into the stream. The leakage from the defective sewer resulted in very high coliform counts in Broad Branch. The FC/FS ratio indicated the bacteria to be of human origin. Although some schools of minnows were observed, the biological conditions suggested mild organic pollution.

Lower Rock Creek in the District of Columbia: The reach of the Creek extending from Piney Branch to the mouth shows high counts of coliforms, fecal coliforms, and fecal streptococci. The contribution of urban runoff caused by storms cannot be entirely separated from the effects of periodic discharges of combined storm and sewage flows into Rock Creek below Piney Branch. The CFS sampling on August 15 occurred shortly after an appreciable shower, and the increase in coliform count for two miles downstream from Piney Branch was clearly evident. At M Street the biological survey indicated severe organic pollution, and the high incidence of surfactants suggested this pollution to be of domestic origin.

The high fecal counts at the ford below the zoo are evidence of pollution by warm-blooded animals, with the lower surfactant level indicating a lesser contribution of domestic wastes. The National Zoological Park has initiated corrective action to control discharge of sanitary wastes into Rock Creek, but there are outdoor exhibit areas, paved and unpaved, from which surface discharges eventually reach the watercourses.

At the time of inspection, piles of bedding and animal wastes were observed on the ground at the Park Police stables at Connecticut Avenue, and there was evidence of movement of these wastes toward and into the Creek. Drainage from the parking lot, corral, and stable discharges into Rock Creek.

A seepage of dark and obviously septic liquid was entering the Creek under the north abutment of the highway bridge leading to the tunnel, approximately 200 feet north of the Calvert Street Bridge during the initial survey, but it had stopped flowing on later observations.

The bacteriological and chemical samples taken near the Slash Run Interceptor, south of P Street in Washington, D. C., were extremely high in fecal bacteria, phosphorus, chlorides, and ammonia, and biological samples indicated the presence of only pollution-tolerant and intermediate forms. Visual observation of particulate human fecal and attendant matter, coupled with olfactory evidence, confirmed severe pollution by sanitary sewage. Flow was observed from the Interceptor during early sampling, but it had stopped on later observations.

C. EXISTING POLLUTION ABATEMENT PROGRAMS

1. Erosion

A work plan was developed in 1962 for the upper Rock Creek Watershed as a joint operation by Montgomery County, the Montgomery Soil Conservation District, and the Maryland-National Capital Park and Planning Commission, with the cooperation of the Soil Conservation and Forest Services of the United States Department of Agriculture. The plan provided for park development along the larger watercourses with two flood control-sediment

trap-recreation reservoirs. Approximately 70 per cent of the acreage has already been acquired; one reservoir has been completed, and the dam for the second is under construction. The completed reservoir will be operated for sediment control when upstream projects under development by the Soil Conservation Service are also in operation to prevent premature silting. The flood regulatory feature is designed to reduce downstream erosion and augment flows, with resultant quality benefits, during low stream flow periods. The work plan is revised periodically and, at present, construction of a chemical treatment basin is under way upstream from the completed reservoir on Rock Creek. It is anticipated that two-thirds of the sediment can be removed by this means, to extend the life of the reservoir 200 per cent and to make the water immediately available for recreational use.

2. Sewerage Separation

In the District of Columbia a substantial part of the Rock Creek drainage area is already served by separate storm and sanitary sewerage. This is in the newly developed northwest area where only storm drainage discharges into Rock Creek. In the older developed areas, combined sewers carry both surface and sanitary wastes via the trunk sewers to the District of Columbia Water Pollution Control Plant, from which the treated effluent is discharged into the Potomac River. Construction of intercepting sewers has eliminated all discharges from sanitary sewers under

dry weather flow conditions, but overflow during heavy storm runoff results in discharges of diluted sanitary sewage into Rock Creek because of inadequate interceptor capacity. The estimated cost of the sewerage separation program for the Rock Creek drainage area, tentatively scheduled for completion by the year 2000, is $103 million. This does not include diversion of stormwater drains from discharging into Rock Creek. At the current rate of allocation of funds, the separation program will not be accomplished according to schedule. Even if the program were accelerated, it would not be possible to complete the separation in less than 20 years without seriously disrupting the traffic arteries by construction.

Industrial wastes and sediment runoffs are not problems in the District of Columbia.

D. POLLUTION CONTROL REGULATIONS

1. Erosion

Montgomery County has pioneered in the regulation of soil erosion by formation of a Rock Creek Watershed Land Treatment Task Force in 1965. Members to the Task Force are: Maryland-National Capital Park and Planning Commission, the Montgomery County Council, the Montgomery Soil Conservation District, and the United States Department of Agriculture, Soil Conservation Service. Subdivision plans are submitted by the developers to the Maryland-National Capital Park and Planning Commission for

approval, after which the planned erosion and sediment control practices become a part of the Public Works Improvement Agreement under the Subdivision Regulations for Montgomery County. The County Department of Public Works reviews and enforces compliance with the approved plans.

Control of soil erosion and washing of deleterious materials in the District of Columbia is provided for in Article 3 of the Police Regulations, which prohibits discharge, except house sewers, into public sewers and requires maintenance of conditions so that materials cannot be washed across public pavements and sidewalks into storm drains. The District of Columbia Code, Chapter 17, Harbor Regulations, Section 22-1703, specifically prohibits discharge of industrial wastes into Rock Creek or the Potomac River.

2. Sewerage

The Washington Suburban Sanitary Commission has the authority to construct and maintain the sanitary sewerage system in Montgomery County. All trunk sewers and any other sewers 15-inch or larger must receive the approval of the State and County Health Departments to assure orderly development of the area's comprehensive sanitary sewerage system. In addition, the Washington Suburban Sanitary Commission approves plans submitted for stormwater drainage facilities for land development projects.

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ROCK CREEK

TABLE 1. SUMMARY OF SAMPLE ANALYSES - CFS

Coliforms and LAS
(June, August, and October 1966)

RIVER MILES	SAMPLE LOCATION	DATE & TIME	COLIFORM CONF BGLB 48 HRS	FECAL COLIFORM EC 24 HRS	FECAL STREP CONF EVAZ 48 HRS	FC/FS	LAS mg/l
0.4	M Street Bridge	6/21/66 (1000)	>160,900	4,600	160,900	0.03	.118
		6/22/66 (1010)	>160,900	2,100	16,090	0.13	.105
		6/29/66 (1115)	>160,900	2,400	17,200	0.14	.673
		8/1/66	9,200	9,200	790	11.6	
		8/2/66	9,200	9,200	170	54.1	
		8/8/66	22,100	14,100	490	28.8	
		8/9/66	34,800	10,900	1,770	6.3	
		8/15/66	2,300	1,300	1,700	0.8	
		10/18/66 (1050)					.255
0.7	Sewer by Francis Jr. High	6/29/66 (0955)	1,700	500	800	0.6	.580
0.7	Bank seepage near N Street sewer	8/9/66	90	0	20	0.0	
0.8	Rock Creek above Jr. High sewer	6/29/66 (1130)	>160,900	9,500	17,200	0.70	
0.9	Slash Run	8/9/66	24,000	24,000	2,400	10.0	
1.0	South end of P Street (sewer)	6/29/66 (1045)	>1,609,000	13,000	918,000	0.01	.512
		8/1/66	11,000	4,600	490	9.4	
1.0	Rock Creek above P Street Bridge	6/29/66 (1145)	>160,900	560	10,900	0.05	
	Massachusetts Avenue Bridge	10/18/66 (1030)					.255
2.6	Calvert Street	8/2/66	54,000	35,000	5,400	6.5	
		8/8/66	1,300	110	2,400	0.05	

ROCK CREEK

TABLE 1. (Continued)

RIVER MILES	SAMPLE LOCATION	DATE & TIME	COLIFORM CONF BGLB 48 HRS	FECAL COLIFORM EC 24 HRS	FECAL STREP CONF EVAZ 48 HRS	FC/FS	LAS mg/l
2.7	Drain 200 ft. below lower Zoo ford	8/9/66	>160,900	17,500	34,800	0.5	
		8/15/66	348,000	348,000	49,000	7.1	
2.7	Ford below Zoo	6/21/66 (1045)	>160,900	2,000	5,420	0.4	.045
		6/22/66 (1040)	21,000	3,900	2,400	1.6	.014
3.0	8-inch drain in Zoo parking lot near tunnel	8/9/66	91,800	34,800	7,900	4.4	
		8/15/66	542,000	542,000	172,000	3.2	
3.2	Seepage under north end of Zoo tunnel building	8/9/66	>160,900	17,500	10,900	1.6	
3.3	Drain ditch north of intersection in Zoo	8/9/66	>160,900	4,200	54,200	0.08	
		8/15/66	240,000	49,000	49,000	1.0	
3.8	Sewer #32	8/8/66	91,800	54,200	5,420	10.0	
		8/9/66	>160,900	>160,900	3,480	46.2	
		8/15/66	240,000	130,000	79,000	1.6	
3.8	Rock Creek near Porter Street	8/2/66	3,500	790	310	2.5	
3.9	Park Road	8/9/66	5,420	140	40	3.5	
	Broad Branch between Soapstone Valley and Rock Creek	8/15/66	240,000	79,000	240,000	0.3	
	Broad Branch broken sewer Albemarle Street	8/15/66	1,609,000	918,000	130,000	7.0	
	Broad Branch storm sewer Albemarle Street	8/15/66	240,000	130,000	79,000	1.7	

ROCK CREEK

TABLE 1. (Continued)

RIVER MILES	SAMPLE LOCATION	DATE & TIME	COLIFORM CONF EGLB 48 HRS	FECAL COLIFORM EC 24 HRS	FECAL STREP CONF EVAZ 48 HRS	FC/FS	LAS mg/l
4.2	Rock Creek at Piney Branch junction	8/2/66	2,400	790	68	11.6	
4.2	100 yards above Rock Creek-Piney Branch junction	8/2/66	2,400	490	330	1.5	
		10/18/66 (1017)					.249
4.4	Piney Branch drain tile	8/9/66	5,240	18	790	0.02	
		8/15/66	130,000	49,000	49,000	1.0	
		10/18/66 (1022)					.096
4.7	Pool above Pierce Mill Park Road	6/21/66 (1120)	2,100	<20	140	0.1	.058
		6/22/66 (1110)	13,000	1,700	220	17.7	.025
		10/18/66 (1024)					.377
4.9	Blagden Avenue	8/1/66	4,900	1,300	78	16.7	
6.8	Military Road	6/21/66 (1145)	3,300	700	140	5.0	.025
		6/22/66 (1130)	2,100	700	80	8.8	.078
		8/1/66	11,000	2,100	78	26.9	
		10/18/66 (1007)					.232
8.1	Sherrill Drive at Picnic area	6/21/66 (1200)	2,300	<20	70	0.3	.033
		6/22/66 (1145)	3,100	<20	80	0.3	.095
		6/29/66 (1445)	>160,900	6,400	10,900	0.6	.390
9.3	Fenwick Branch just west of Rock Creek	8/8/66	9,180	330	1,300	0.3	

ROCK CREEK

TABLE 1. (Continued)

RIVER MILES	SAMPLE LOCATION	DATE & TIME	COLIFORM CONF BGLB 48 HRS	FECAL COLIFORM EC 24 HRS	FECAL STREP CONF EVAZ 48 HRS	FC/FS	LAS mg/l
10.0	District Line Bridge	6/21/66 (1305)	3,300	800	80	10.0	.070
		6/22/66 (1205)	2,200	800	270	3.0	.063
		6/29/66 (1430)	>160,900	5,400	2,200	2.5	.316
		8/1/66	2,400	490	130	3.8	
		8/2/66	3,500	3,500	170	20.6	
		8/8/66	3,480	1,720	490	3.5	
		8/9/66	3,480	150	330	0.5	
		8/15/66	49,000	8,000	17,000	0.5	
		10/18/66 (0950)					.102
10.7	Overflow by shelter house - Woodbine Street	6/29/66 (1420)	13,000	200	700	0.3	.099
11.1	East-West Highway	6/21/66 (1320)	4,800	800	9,180	0.1	.040
		6/22/66 (1340)	91,800	3,400	1,720	2.0	.061
		6/29/66 (1400)	>160,900	1,500	13,000	0.1	
		8/1/66	1,300	140	68	2.1	
		8/15/66	33,000	7,000	17,000	0.4	
11.3	Coquelin Run at Jones Mill Road (Beach Drive)	8/1/66	490	18	<20	0.9	
		8/8/66	3,480	1,300	790	1.6	
		8/9/66	3,480	1,300	1,720	0.8	
		8/15/66	33,000	33,000	33,000	1.0	
		10/18/66 (0937)					.072
11.3-0.9	Coquelin Run at Connecticut Avenue	8/8/66	16,000	1,720	1,700	1.0	
		8/9/66	24,000	9,180	1,300	7.1	
11.3-1.5	Coquelin Run at East-West Highway	8/8/66	3,480	790	130	6.1	
		8/9/66	3,480	1,300	1,720	0.8	

ROCK CREEK

TABLE 1. (Continued)

RIVER MILES	SAMPLE LOCATION	DATE & TIME	COLIFORM CONF BGLB 48 HRS	FECAL COLIFORM EC 24 HRS	FECAL STREP CONF EVAZ 48 HRS	FC/FS	LAS mg/l
13.5	Kensington Avenue	8/1/66	9,200	260	110	2.4	
14.6	NNMC - Bethesda	8/1/66	2,400	61	20	3.0	
14.8	Cedar Lane at Rock Creek	6/21/66 (1340)	900	<20	80	0.3	.035
		6/22/66 (1400)	4,900	200	50	4.0	.058
		6/29/66 (1325)	>160,900	7,900	4,900	1.6	.400
		8/1/66	2,200	130	220	0.6	
		8/8/66	1,720	330	130	2.5	
		8/9/66	2,210	330	50	6.6	
		8/15/66	13,000	3,300	8,400	0.4	
		10/18/66 (0931)					.046
15.4	Cedar Lane - NIH ditch	8/1/66	1,300	78	130	0.6	
17.3	Knowles Avenue	8/2/66	2,400	1,300	330	3.9	
21.2	Viers Mill Road	6/21/66 (1410)	1,700	500	130	3.8	.033
		8/2/66	330	130	170	0.8	
23.1	Norbeck Road	8/2/66	460	210	130	1.6	
23.8	Avery Road	6/21/66 (1430)	1,700	200	330	0.6	.031
		8/2/66	490	20	170	0.1	
	Rock Creek at Muncaster Road	8/2/66	1,300	1,300	170	7.7	
		8/2/66	5,400	2,400	2,100	1.1	
	Rock Creek at Needwood Road	8/2/66	1,300	330	93	3.6	

POTOMAC RIVER: ROCK CREEK

M STREET BRIDGE - WASHINGTON, D. C.

TABLE 2. NITROGEN AND PHOSPHORUS ANALYSES - CFS

Week 1966	Ammonia Nitrogen NH_3 - N mg/l	Nitrite Nitrogen NO_2 N mg/l	Nitrate Nitrogen NO_3 N mg/l	Inorg N mg/l	Ortho P mg/l	Total P mg/l
1 - 13		.002	.934	.936	.19	.30
1 - 20	.23	.002	1.080	1.312	.12	.16
1 - 25	.12	.003	.82	.943	.15	.33
2 - 9	.37	<.0002	1.588	1.958	.24	.37
2 - 10	.30	.0002	1.232	1.532	.25	.41
2 - 16	.04	.001	1.08	1.121	.17	.50
2 - 23	.47	ND	1.25	1.720	.39	.70
2 - 28	.21	.003	.97	1.183	.15	.36
3 - 9	.06	.001	1.20	1.257	.15	.24
3 - 16	.24	.002	1.19	1.432	.19	.32
3 - 23	.09	.001	.77	.861	.07	.14
3 - 30	.06	.001	.79	.851	.06	.12
4 - 6	.08	.003	.54	.623	.07	.12
4-11 to 4-17	.12	.004	.74	.864	.15	.36
4 - 20	.10	.018	.66	.778	.17	.50
5- 2 to 5- 8	.05	.015	.78	.845	.20	.51
5 - 10	.10	.085	.58	.765	.11	.24
5 - 18	.09	.021	.70	.811		.28
5 - 25					.41	.33

ROCK CREEK

TABLE 3. TURBIDITIES* - October 19, 1966

LOCATION	TIME & TURBIDITY		TIME & TURBIDITY		TIME & TURBIDITY		TIME & TURBIDITY	
Military Road	0610	60	0800	70	1000	75	1200	92
Rock Creek above Broad Branch	0620	75	0815	82	1005	85	1205	96
Broad Branch above Rock Creek	0625	35	0817	38	1007	28	1207	28
Pierce Mill at Pool	0630	80	0822	92	1010	67	1210	88
Piney Branch above Rock Creek	0640	80	0830	98	1016	110	1215	105
Rock Creek-- Harvard Street entrance to Zoo	0650	87	0835	90	1020	78	1220	98

25

* Note: Turbidity in JTU = ppm silica scale (approximately).

APPENDIX 1

INVENTORY OF ALL DRAINS, CULVERTS AND PIPES ENTERING ROCK CREEK

(Includes D. C. Combined Sewer Outfalls Previously Listed)

Rock Creek from M Street Bridge to below Massachusetts Avenue Bridge

A1. 100 yards above M Street Bridge stone culvert 3 feet diameter--dry. West bank. D. C. overflow No. 1. Olive Street extended.

A2. 200 yards above M Street. East side. Drop culvert discharging 6/17/66. Has been cut off since. This is D. C. Sewer No. 3. M Street.

A3. 400 yards above M Street Bridge. Street drain. Dry. West side.

A4. 450 yards above M Street. Large box culvert connected to sewer manhole; no discharge.

A5. Large manhole on west bank.

A6. 100 yards downstream at "P Street Beach"--12-inch culvert built into abutment. No discharge. East side.

A7. 8-foot diameter pipe with invert below water. Discharging a grayish material. This is Slash Run interceptor. Flowing 6/17/66; has been effectively cut off since August 1.

A8. 100 feet below P Street Bridge 1 1/2 x 2 foot culvert set in stone abutment; no flow. East bank. Storm drain.

A9. P Street sewer--discharging under a nicely designed outlet structure which conceals flow. East bank on upstream side of P Street Bridge. This is D. C. Sewer No. 7. Northwest Boundary Trunk Sewer.

A10. 1 1/2 x 2 foot culvert, west side, 50 yards above P Street Bridge. No drainage.

A11. Q Street Bridge--dry culvert, west side. D. C. overflow No. 26.

A12. Several drain pipes on west of stream through retaining wall. No flow observed.

APPENDIX 1 (Continued)

A13. Several drains in east side draining flat park area. No flow observed.

A14. Dam below Massachusetts Avenue Bridge.

Rock Creek from Dam below Massachusetts Avenue Bridge and proceeding upstream to ford at south side of National Zoological Park

B1. 2-foot drain and overflow pipe west bank 50 feet above dam. Pipe dry. Dam at Dumbarton Oaks Park Creek. Confluence.

B2. 4-inch pipe over overflow from powerhouse (?). Both dry. 100 feet above dam. East bank.

B3. Storm runoff 200 feet above dam. East bank.

B4. D. C. Sewer No. 27. West bank.

B5. 2 1/2-foot drain 150 feet above dam; clear water flowing. West bank.

B6. Storm runoff 100 feet south of Massachusetts Avenue Bridge. West bank.

B7. Three storm drain pipes 6-8 inches draining Massachusetts Avenue Bridge, east bank.

B8. 18-inch storm drain 150 yards above Massachusetts Avenue Bridge, east bank.

B9. 2-foot pipe 300 yards south Sewer No. 24. West bank. Pipe 3/4 submerged in creek.

B10. 6-inch pipe, continuous flow, water clear. No visible sign of sewage. 300 yards south of D. C. Sewer No. 28. East bank.

B11. 18-inch storm drain 250 yards south of Sewer No. 28. Dry. East bank.

B12. Normanstone Creek.

B13. D. C. Sewer No. 28.

B14. 10-inch storm drain. East bank. Dry.

APPENDIX 1 (Continued)

B15. D. C. Sewer No. 29.

B16. D. C. Sewer No. 9.

B17. Storm drain 200 yards south of D. C. Sewer No. 30. East bank.

B18. D. C. Sewer No. 30.

B19. 18-inch storm drain east bank across from D. C. Sewer No. 30.

B20. 18-inch storm drain east bank above D. C. Sewer No. 30.

B21. Small stream 75 yards above D. C. Sewer No. 30. West bank. Light flow, slightly cloudy, sewage smell and visible sewage.

B22. D. C. Sewer No. 10.

B23. 75 yards above 10, 12-inch pipe, dry. West bank.

B24. Open sewer 100 yards above Sewer No. 10, west bank. Light flow. Green colored pool at mouth. This may be corral washings from Park Police stable.

B25. 9-inch pipe 300 feet south of Sewer No. 31. West bank. Dry.

B26. Storm drain Connecticut Avenue Bridge. West bank, dry.

B27. Drainage from Park Police stables enters on east side on downstream side of Connecticut Avenue Bridge. Evidence of manure and stableage materials entering Rock Creek from a parking lot drain was found.

B28. D. C. Sewer No. 11.

B29. D. C. Sewer No. 31.

B30. 25 feet above Sewer No. 31 dry gully, strong sewage odor, east bank.

B31. D. C. Sewer No. 12.

B32. 14-inch storm drain above stable bridge dry. West bank.

B33. Storm drain, dry, 100 yards above Sewer No. 12, west bank.

APPENDIX 1 (Continued)

B34. 100 yards above Sewer No. 12 (A) Extremely heavy ground seepage; (B) 4-inch pipe continuous flow, east bank. This is a surface stream which flows behind a retaining wall and is discharged into Rock Creek.

B35. Storm drain, dry, Calvert Street Bridge. West bank.

B36. 100 feet above Calvert Street Bridge storm drain, dry, east bank.

B37. Storm drain by tunnel bridge slow flow. East bank.

B38. Center foundation of tunnel bridge. East bank broken sewer source. Bottom seep in stream bed. This has been sampled. This has been cut off and has not been observed recently.

B39. 75 yards below ford, dry storm drain, east bank.

Rock Creek from National Zoological Park, West Bank, below Ford to Porter Street

C1. Zoo Sewer 12--Steady flow, oily, 5-foot pipe.

C2. Zoo Sewer 5--18-inch pipe flowing.

C3. Zoo Sewer 3--Culvert 3-foot diameter flowing has been sampled.

C4. Zoo Sewer 2--12-inch pipe flowing.

C5. Zoo Sewer 4--Effluent smelly, partially closed by silt.

C6. Zoo Sewer 6--18-inch pipe corrugated heavy flow, yellow color.

C7. Zoo Sewer 13--Runoff storm drain, oily water, drains parking lot.

C8. Zoo Sewer 14--Flowing, storm runoff from parking lot.

C9. Zoo Sewer 15--Flowing, 8-inch iron pipe, cantilevered 4 feet, duck pond drain. Heavy flow.

C10. Zoo Sewer 16--Parking lot runoff, oily plus trash.

C11. Zoo Sewer 17--Oily, trash, no flow.

APPENDIX 1 (Continued)

C12. Runoff from Zoo parking lot, 8-inch pipe, dry.

C13. Zoo Sewer 1--Culvert at Harvard Street Bridge, flowing.

C14. 1-foot pipe, dry.

C15. Storm drain, nearly closed.

C16. 10-inch pipe, slightly running, heavy oil.

C17. Zoo Sewer 7--1-foot pipes, minor flow.

C18. Zoo Sewer 8--1-foot pipes, minor flow.

C19. Zoo Sewer 9--1-foot pipes, minor flow.

C20. Zoo storm drain, garage, oil.

C21. Zoo Sewer 10--Extreme amount of sewage on the creek bank.

C22. Storm drain, runoff, dry.

C23. Stream, very light flow.

C24. Stream, light flow, clear, next to Sewer 32.

C25. D. C. Sewer 32, flowing, estimate 0.2-0.5 cfs. Has been sampled. This is the largest observed overflow and is from a supposedly plugged sewer.

C26. 12-inch drain running sewage. (East bank through to Klingle Road)

Rock Creek from National Zoological Park, East Bank from Ford to Porter Street Bridge

D1. 150 yards above ford, 10-inch pipe, no visible flow. East bank Zoo ford to Porter Street.

D2. Storm drain 50 feet from start of wall filled with silt.

D3. Storm drain 100 yards north of start of wall.

D4. Storm drain 150 yards north of start of wall.

APPENDIX 1 (Continued)

D5. Storm drain 200 yards north of start of wall.

D6. 25 feet south Sewer 13. Storm drain dry.

D7. D. C. Sewer 13.

D8. 2-foot storm drain 50 feet south of Zoo bridge, dry.

D9. D. C. Sewer 14.

D10. Storm drain 25 feet south of Sewer 15, running, high iron content.

D11. D. C. Sewer 15.

D12. Storm drain 100 feet north Sewer 15, dry.

D13. D. C. Sewer 16.

D14. D. C. Sewer 17.

D15. 300 yards north of D. C. Sewer 17 storm drain, dry.

D16. 500 yards north of Sewer 17 storm drain, dry.

D17. 600 yards north of Sewer 17 storm drain, dry.

D18. 650 yards north of Sewer 17 storm drain, dry.

D19. 750 yards north of Sewer 17 storm drain, dry.

Soapstone Creek, Tributary of Rock Creek, West Side in Park, from 32nd and Albemarle Street downstream

E1. 5-foot sewer line head of Soapstone Creek. Pool below mouth of sewer covered with scum, soapsuds, paper, and miscellaneous materials not surface runoff type. Odor of sewage noticeable.

E2. 200 feet below mouth of sewer, 4-inch pipe, steady flow, water clear, possibly from apartment building.

E3. 50 feet below No. 2 same as above.

APPENDIX 1 (Continued)

E4. 4-foot sewer crossing creek, broken in one area. Raw sewage leaking out. A gray mossy growth commonly found in sewage was observed in Soapstone Creek downstream from this point.

E5. 18-inch sewer, slight flow with evidence of sewage; signs of heavy flow at times.

E6. 3-foot pipe, heavy flow, water looks clear. Just below apartment building. This flow comes from the west under Connecticut Avenue.

E7. Two 1-foot pipes, ground seepage. Just below apartment building.

E8. Small creek from spring, appears to be clean.

E9. Small creek from 18-inch pipe under building under construction, water slightly cloudy. Evidence of iron content at mouth of pipe.

E10. Small creek, water clear, spring source probable.

E11. Runoff from street, dry.

E12. 2-foot pipe near end Audubon Terrace Drive, slight flow. Water clear.

E13. 75 feet below No. 12 small stream, water clear. Opposite No. 13, ground seepage from concrete block, strong odor of sewage present.

E14. 18-inch pipe, possible runoff, dry.

Melvin C. Hazan Park Creek. From Connecticut Avenue downstream

F1. Oil flowing out with spring water. Hearsay evidence indicates that this oil was spilled at the Broadmoor Apartments 1 1/2 blocks south of this point. D. C. Health Department has been notified and has made preliminary inquiries.

F2. Flows 50 feet, emerges with sewer. Discharge looks clear. No sign of sewage.

F3. Rocks in stream coated with oil scum. Oil layers observed in quiescent pools.

APPENDIX 1 (Continued)

Rock Creek from Porter Street Bridge to D. C. Line

G1. Approximately 300 yards above Porter Street--2 storm drains, dry.

G2. Drain near Hazan Park drainage confluence. Near Pierce Mill, east side of creek. Dry.

G3. Drain pipe above Item 2, east side of creek.

G4. Drain pipe at Tilden Street Bridge, west side of creek near playground.

G5. Military Road, in bridge abutment, east side of creek.

G6. 200 yards above Military Road--3-inch pipe draining from east.

G7. Sewer manhole No. 335 below USGS gaging station.

G8. 100 yards above Sherrill Drive. One large drain and one small drain. West side of Rock Creek at playground. Small pipe drains drinking water fountain. Large pipe appears to drain the parking lot.

G9. 500 yards above Sherrill Drive--storm drain.

Pinehurst Branch from Origin downstream to Extinction

Creek begins 100 yards west of Oregon Avenue. 50 feet below beginning, 4-foot pipe enters from left. Slight flow, visible signs of sewage. Strong sewage odor. Creek dries up 50 feet below Oregon Avenue.

Rock Creek from D. C. Line North to Capitol Beltway

H1. Bridle Path Bridge Blackhorse Trail, two 24-inch storm drains, dry. West bank. Foot of Windalle Road.

H2. Small stream storm drainage, light flow 50 yards above 1. East bank.

H3. 3-foot pipe above ford, dry. Storm. West bank.

H4. 8-inch pipe 75 feet below pedestrian stoplight. West bank. Light flow, visible sewage.

APPENDIX 1 (Continued)

H5. Storm drain 75 yards above pedestrian crossing. East bank.

H6. 14-inch pipe below school, water clear, slight flow. West bank.

H7. Small creek from 4-foot storm drain and 14-inch pipe. (Woodbine Street Sewer.)

H8. E-1 (Donny Brook) Confluence.

H9. Creek 100 yards above E-W Highway. West bank. Slight flow.

H10. W-2 (Coquelin Run) Confluence.

H11. Creek, light flow, runs in above green house, west bank.

H12. Creek, light flow, broken sewer leaking into creek bed. (Locate and inspect this one.)

Rock Creek from Capitol Beltway to Cedar Lane

J1. East of Beltway overpass storm drain running heavily. Water clear.

J2. West lane, west side, stream runoff, bed dry.

J3. West, north side, runoff dry, 25 yards from Beltway bridge.

J4. 24-inch pipe leading to creek, slow flow, signs of sewage.

J5. South side, storm drain, dry, 100 feet below Connecticut Avenue exit sign.

J6. 3-foot pipe, dry, above sign.

J7. Creek, one-half mile from bridge drain small amount of flow.

J8. South side of Creek storm drain, dry.

J9. North side of creek, stream, flow heavy.

J10. 24-inch pipe drain, east of Connecticut Avenue Bridge.

J11. 25-inch pipe one-fourth mile above Connecticut Avenue Bridge, flow slight.

APPENDIX 1 (Continued)

J12. 3-foot pipe. Water black, soap north side of creek.

J13. Creek south bank. Water slightly polluted looking below Summit Avenue.

J14. Creek west bank, small amount of flow.

J15. Storm drain, no flow south bank.

J16. 4-foot sewer, running, soapsuds, 100 yards south of Cedar Lane, west side of creek.

Rock Creek from Cedar Lane to Knowles Avenue

K1. W-3 Confluence of unnamed stream.

K2. Storm drain; under beltway, dry.

K3. 2-foot storm drain, east bank, dry.

K4. Small creek, east bank, dry.

K5. W-4 and W-5 Confluences of unnamed stream.

K6. Storm drain east bank, dry.

K7. 3-foot drain east bank, dry.

K8. 2-foot drain east bank, dry.

K9. Stream west bank, W-6, Confluence of unnamed stream.

K10. 2-foot drain west bank in woods, slight flow.

K11. Stream west bank, dry.

Rock Creek from Knowles Avenue to Gaynor Road

L1. Runoff from Newport Drive dry.

L2. Creek from 4-foot pipe, no flow.

L3. Dry creek storm drain east bank.

APPENDIX 1 (Continued)

L4. Stream, clear flow (E-5).

L5. Stream, dry, storm drain.

L6. Small creek, dry. West bank.

L7. Stream, dry.

L8. Creek, light flow, clean.

L9. Creek, clear light flow, west bank.

L10. Creek, slight flow, clear.

L11. 4-inch dry pipe 200 yards above swings on playground, east side.

L12. 14-inch overflow; street overflow just below Randolph Street, west bank.

L13. 3-foot storm drain across from above.

L14. Stream emptying from a 4-foot sewer, some sewage, slight odor (above Randolph Street).

L15. Creek, east bank, light flow, water clear.

L16. Stream, no flow, pools covered with scum.

Rock Creek from Gaynor Road to Norbeck Road

M1. W-10.

M2. Pool 400 yards off Viers Mill Road and St. Judas School. Signs of sewage, smell and discoloration of water.

M3. Creek south side of second bridge, west bank, water light brown in color; 300 yards above second bridge stream east side bank strong odor, brown color of water.

M4. W-12.

M5. Creek west side bank, dry.

M6. Creek east side small flow.

APPENDIX 1 (Continued)

M7. Creek west side small flow.

M8. Creek 25 feet above bridge clear, running fast.

M9. Creek east bank running slight.

Rock Creek North of Norbeck Bridge

N1. Creek west bank, slight flow.

N2. Sewers on both sides of creek, no visible leakage.

N3. Creek 20 feet north of sewers. No flow, east bank.

N4. Spring west bank clear slight flow.

Coquelin Run upstream from Jones Mill Road Bridge near Confluence with Rock Creek

01. 3-foot storm drain 300 yards above bridge, dry.

02. 18-inch pipe, light flow, extreme amount of algae.

03. 4-inch pipe 100 yards above No. 2 same side of creek, pipe, dry.

04. 4-inch pipe 100 yards above No. 3, light flow, water clear.

05. Stream, dry.

06. 18-inch storm drain, dry.

07. 24-inch storm drain from Connecticut Avenue, dry.

08. Stream above Connecticut Avenue flowing under chlorine tanks from swimming pool, water clear.

09. West end of lake small stream, flow fairly clear. Lake is cloudy green. Coliform counts high.

010. Just inside country club fence, pools of cloudy green water. Laboratory analyses show high coliforms.

APPENDIX 1 (Continued)

O11. Numerous sewer lines just before East-West Highway. Water cloudy and green. Sources unknown, but some evidence of pollution.

O12. Creek east bank, slight flow, water hazy.

O13. Two 18-inch storm drains at end of Maple Avenue, both dry.

O14. Two 6-inch pipes and street runoff on east bank, water clear.

O15. 6-inch drain, east bank, dry.

O16. 18-inch drain west bank, no flow.

O17. 2-foot drain west bank, no flow.

E-2: This stream drains Forest Glen, and its confluence with Rock Creek is at the Capitol Beltway Bridge

P1. Stream on the left, running slow, clear.

P2. Sewer 2-inch pipe 500 yards below first bridge, strong odor, white stuff all around. Forest Glen.

P3. Sewage line burst, very little running out, 25 feet below second bridge (Capitol View Avenue).

P4. Pipe 4-inch, no flow, 25 feet below second bridge.

P5. 24-inch pipe clean, dry, below third bridge.

E3: This stream drains Rock Creek Hills, and its confluence with Rock Creek is near the Capitol Beltway Overpass, over Story Brook Drive

Q1. Dry

E-4: This stream drains the Kensington area, and its confluence with Rock Creek is at the Kensington Parkway Bridge

R1. 18-inch storm drain, dripping, east bank.

R2. 75 yards above bridge, stream, no flow.

R3. 18-inch storm drain 100 yards above bridge, dry.

APPENDIX 1 (Continued)

R4. 8-inch storm drain 125 yards above bridge, dry.

R5. Two storm drains, slight flow, 200 yards above bridge, water clear.

R6. 2-foot storm drain, Frederick Avenue, dry.

R7. 2-foot storm drain, dry, 75 yards above Frederick Avenue.

R8. 300 yards above Frederick Avenue, east bank, storm sewer, heavy flow, water clear, no odor.

R9. 50 yards below Kent Street 18-inch storm drain, west bank, dry.

R10. 50 yards above Kent Street 18-inch storm drain, west bank, dry.

R11. 50 feet below street storm drain slight flow.

R12. Runoff, dry, halfway between bridges.

R13. Storm drain at bridge dry.

R14. Small creek, light flow, clear.

R15. Storm drain from parking lot flowing; something being washed off.

R16. Storm drain from Murdock Road, dry.

R17. Storm drain from school ground, dry.

R18. 3-foot storm drain slight flow, muddy water.

R19. Runoff from school parking lot, dry.

W-2: Stream Draining National Naval Medical Center, Bethesda. Proceeding upstream.

S1. Inside of hospital grounds stream, east bank, slight flow, water clear.

S2. Stream, moderate flow, fluid is extremely cloudy and milky in color, behind Exchange.

APPENDIX 1 (Continued)

S3. 24-inch sewer, light flow and clear, below stream pipe went into sewer.

S4. Overflow from evaporation slight.

S5. 3-foot sewer below third bridge, slight flow, looks clear.

S6. 3 dry storm drains around foot bridge.

S7. 18-inch pipe about 20 feet below second bridge, dry.

S8. Same as above, 12-inch pipe with very slow flow, pool below pipe very full of pollution substances.

S9. 24-inch sewer opposite parking lot, dry.

S10. 6-inch and 2-inch pipes below parking lot, both dry.

S11. Two 12-inch drain pipes 75 yards below fence (Jones Bridge Road).

S12. Stream goes underground from hospital fence to Wisconsin Avenue.

S13. 24-inch sewer just above Wisconsin Avenue, slight flow, algae in area.

S14. 3-foot storm sewer, slight flow.

S15. Parking lot runoff.

W-3: This stream drains the National Institutes of Health upstream from confluence with Rock Creek.

T1. Creek starts from a 6-foot pipe.

T2. 24-inch pipe, running slow, 75 feet from bridge.

T3. 24-inch pipe, running fast, soapsuds beside second bridge.

T4. 2-foot pipe, dry, 25 feet from third bridge.

T5. 2-foot pipe, dry, 25 feet from third bridge.

T6. 8-inch pipe, dry, 75 feet from third bridge.

APPENDIX 1 (Continued)

T7. 25 feet below fourth bridge, stream running fast, needs to be walked.

T8. 4-foot pipe, slight flow, storm drain.

T9. 3-foot pipe 3/4 submerged below fourth bridge, no flow.

T10. 24-inch pipe, no flow, 25 feet below fifth bridge.

T11. 2-foot pipe, no flow, 25 feet below fifth bridge.

T12. 2-foot pipe, no flow, above fifth bridge.

W-4: This stream drains north Bethesda from Pooks Hill. Its confluence with Rock Creek is near Wisconsin Avenue.

U1. Dry

E-5: This stream drains Viers Mill Village and Connecticut Gardens

V1. Spring west bank, dry.

V2. 75 yards below creek (No. 3), scum on top of water brown in color.

V3. Creek east bank. no flow, water muddy with trash. Probably E-5-A.

V4. 600 yards above creek (No. 3), creek west bank, light flow.

V5. 2-foot drain at the end Garrett Park Road dry, trash below.

V6. Creek west bank, light flow, orange scum on the water.

E-5-A

W1. 24-inch storm drain, Viers Mill Road, dry.

W2. Goes into pipe at Weisman Road, storm drains emptying at intervals. Comes out at lower part Valleywood Road.

W3. Farnell and Valleywood Roads, 12-inch storm sewer, oily, algae.

APPENDIX 1 (Continued)

W4. Hathaway and Valleywood Roads, storm sewers, oily, algae.

W5. 300 yards below head, 12-inch storm runoff, dry.

W6. 150 yards below head, 12-inch storm runoff, dry.

W7. Head emerges from 2-foot pipe, water full of newspaper and trash.

E-5-C

X1. Stream runs in underground pipe storm drainage, water flowing.

X2. Large amount fine silt deposited.

W-5: Drains Weldwood Manor

Y1. 2-foot pipe 3/4 full of water, no flow. At head of creek. Signs of sewage.

Y2. 24-inch pipe 3/4 full of trash, no flow. 25 feet below first bridge on the hill.

Y3. Stream running clean, 600 yards from first bridge.

Y4. Storm drain right below second bridge.

Y5. Storm drain, running slow.

W-6: Drains Garrett Park and Garrett Park Estates

Z1. Pool 50 yards from mouth full of speckled and brown trout.

Z2. Creek turns into small pond in Grosvenor Park Apartments, water below dam filled with algae and brown scum.

Z3. 6-inch drainage from apartments, light flow, clear.

Z4. Storm drainage from road, dry.

Z5. Storm drainage from Route 70, dry.

APPENDIX 1 (Continued)

Z6. 3-foot storm sewer, dry, Cheshire Drive, water full of algae and shopping carts.

Z7. Runoff from swimming pool, 25 yards above Cheshire Drive.

Z8. Dry stream comes out at Grosvenor storm sewers.

W-6-A

All storm drainage and runoff.

W-6-B

AA1. Creek bed at source, dry.

AA2. Pond in farmyard, water muddy, flowing, brown algae in pond.

AA3. Creek continues dry after pond.

AA4. 200 yards from pond pools of muddy water.

AA5. Farm road fords creek.

AA6. 100 yards from ford, water reappears in creek, slight flow.

AA7. Creek east bank, dry, 150 yards from start of flow.

AA8. 250 yards from start of flow, flow ends (creek bed muddy).

AA9. 150 yards from No. 8, road ford.

AA10. Creek west bank, slight flow.

AA11. 100 yards below mouth of No. 10, flow stops in creek. After flow stops, pools of water at intervals.

AA12. Creek west bank, moderate flow, water clear.

AA13. Trestle, not in use, 100 yards from side creek.

AA14. Creek passes under road through pipe.

AA15. After road, creek enters Grosvenor Park Apartments.

AA16. 200 yards from road, creek enters pond, slight scum.

APPENDIX 2

BIOLOGICAL SAMPLING STATIONS
ROCK CREEK

Station #1

This station was located at the Avery Road Bridge north of Rockville, Maryland. The water was clear, and numerous minnows were observed throughout the area. A total of nine genera of bottom organisms were found, which included such clean-water associated forms as mayflies (2 genera), caddisflies, and fishflies. Good water quality was indicated based on the bottom organisms.

Station #2

This station was located on the East Branch of Rock Creek at the Maryland Route 115 Bridge north of Rockville, Maryland. The water was very clear, and numerous minnows were observed. A total of 17 different genera of bottom organisms were collected, which included such clean-water forms as stoneflies, mayflies (3 genera), caddisflies (2 genera), fishflies, and riffle beetles. Excellent water quality was indicated. A total of 109 bottom organisms were collected in the square foot sample, which included 35 caddisflies, 20 mayflies, 15 riffle beetles, and 4 fishflies.

Station #3

This station was located on a tributary to Rock Creek at Avery Road on the east edge of Rockville, Maryland. Only four genera of bottom organisms were found, and the population was sparse. However, mayflies and caddisflies were the dominant organisms. Fair water quality was indicated.

Station #4

Rock Creek was sampled at the Maryland Route 28 Bridge east of Rockville, Maryland. A total of 16 genera of bottom organisms were sampled, which included such clean-water forms as mayflies, caddisflies (2 genera), fishflies, and riffle beetles. The water was somewhat murky, but small schools of minnows could be observed. Only 35 bottom organisms were collected in the square foot sample with fingernail clams (an intermediate) being the dominant form with 15 in number. Good water quality was indicated.

APPENDIX 2 (Continued)

Station #5

The next station downstream was located off Gaynor Road immediately upstream from Randolph Road at Viers Mill Village, Maryland. The water was somewhat cloudy, and trash was fairly abundant in the stream. Bottom organisms were sparse, and only four genera were found. Only one clean-water caddisfly was found. The balance consisted of two intermediate genera and a pollution-tolerant form. Only fair water quality was indicated.

Station #6

This station was located at the Route 547 Bridge (Knowles Avenue) at Garrett Park, Maryland. The water was clear, and small schools of minnows were observed. Bottom organisms were not too abundant, and only five genera were sampled. However, they included such clean-water forms as mayflies (2 genera) and caddisflies. Good water quality was indicated.

Station #7

This station was located at Beach Drive and Cedar Lane near Kensington, Maryland. The water was exceptionally clear, and numerous minnows were observed. Ten different genera of bottom organisms were found, which included such clean-water forms as mayflies (2 genera) and caddisflies (2 genera). A total of 224 bottom organisms were collected in the square foot sample, which included 27 mayflies and 3 caddisflies. The dominant form was an intermediate midge larva which made up 190 of the total count. Good water quality was indicated.

Station #8

The next station downstream was located at Jones Mill Road downstream from the Beltway-Route 495 at Chevy Chase, Maryland. Again the water was exceptionally clear, and numerous small minnows were observed. Only three genera of bottom organisms were found, but they consisted mainly of two genera of caddisfly larvae. Good water quality was indicated.

Station #9

The next station was located on Coquelin Creek at Jones Mill Road Bridge at North Chevy Chase, Maryland. Coquelin Creek enters Rock Creek a short distance downstream. The water was clear, but the

APPENDIX 2 (Continued)

filamentous algae was heavy in much of the area suggesting excessive nitrogen and phosphorus. Oil slicks arose when some of the bottom was stirred up by walking. (This stream is quite small.) A total of 12 genera of bottom organisms was found, which included a fair population of mayflies and caddisflies. Blackflies were the dominant organism and made up 155 of the 192 organisms in the square foot sample. Only fair water quality was indicated.

Station #10

The next station downstream on Rock Creek was located downstream from the East-West Highway 410 at the Rock Creek Recreation Center. The water was clear, and minnows were observed. A total of 10 genera was found, but bottom organisms were generally sparse. A few mayflies were sampled, but only 23 organisms were collected in the square foot sample. Fair water quality was indicated.

Station #11

This station was located approximately 100 yards downstream from West Beach Drive at the junction with Wise Road in Washington, D. C. The water was clear, but only three genera of bottom organisms were found, which consisted of two pollution-tolerant genera and one intermediate genera. Bottom organisms were sparse, and a quantitative sample was not taken. About 20 yards downstream a large storm sewer empties from the left bank (facing downstream). The bottom in this channel appeared to be coated with oil, and oil slicks came to the surface when the bottom was disturbed. Mild pollution is suggested in this area.

Station #12

This station was located at the roadside park immediately downstream from Military Road, Washington, D. C. The water was clear, but only five genera of bottom organisms were found, which consisted of three organic pollution-tolerant genera and two intermediate forms. Generally, bottom organisms were sparse. A small tributary comes in from the left bank a short distance downstream. This was very heavy with filamentous algae, suggesting high nitrogen and phosphorus. Mild organic pollution is suggested.

Station #13

Rock Creek was then sampled at Park Road Bridge in Washington, D. C. The water was clear, and small schools of minnows were observed.

APPENDIX 2 (Continued)

Eight genera of bottom organisms were sampled, but they consisted of four organic pollution-tolerant forms and four intermediate forms. Bottom organisms were not abundant. Only 27 were collected in the square foot sample. Mild organic pollution is suggested.

Station #14

Piney Branch, a tributary to Rock Creek, was sampled at the Park Road Bridge in Washington, D. C. The water was clear, but filamentous algae were extremely abundant on the rocks and gravel. Nine genera were collected, but the only clean-water form found was a mayfly. The balance consisted of two intermediate forms and six pollution-tolerant forms. The dominant form was an intermediate midge larva, which made up 75 of the 113 bottom organisms in the square foot sample. A faint sewage odor was detected, and high nitrogen and phosphorus are suggested by the heavy algae. Mild organic pollution is suggested at this station. Piney Branch is believed to contribute a mild pollutional load to Rock Creek.

Station #15

The next station downstream was located near the Harvard Street Entrance at the National Zoological Park at Washington, D. C. The water was clear, but the rocks were coated with slime. Although nine genera of bottom organisms were found, only fair populations of an intermediate midge larva and a pollution-tolerant snail were sampled. The other bottom organisms were sparse. The intermediate midge larva made up 86 of the 103 bottom organisms in the square foot sample. Mild organic pollution is suggested.

Station #16

The next downstream station was located at the Calvert Street Bridge in Washington, D. C. The water was clear, and numerous minnows were observed; however, a faint sewage odor was detected. Although ten genera of bottom organisms were found, the only clean-water form consisted of a few caddisfly larvae. An intermediate midge larva made up 46 of the 55 organisms collected in the square foot sample. Sludge-worms, the bloodworm midge Chironomus, blackflies, and two genera of pollution-tolerant snails were collected. Mild organic pollution was indicated.

APPENDIX 2 (Continued)

Station #17

Rock Creek was then sampled immediately upstream from the P Street outfall in Washington, D. C. The water was clear, and small schools of minnows and sunfish were observed, but they did not venture downstream below the outfall. Broken glass and trash were heavy in the stream. Six genera of bottom organisms were collected, which consisted of four organic pollution-tolerant forms and two intermediate forms. The dominant forms were an intermediate midge (98) and sludgeworms (43) out of the 316 bottom organisms collected in the square foot sample. Mild organic pollution is indicated.

Station #18

The next station was located approximately 25 yards downstream from the P Street outfall in Washington, D. C. A faint sewage odor was detected, and trash was observed in the stream. Only five genera of bottom organisms were found, which consisted of four organic pollution-tolerant forms and one intermediate kind. The pollution-tolerant genera consisted of bloodworms, sludgeworms, leeches, and a pollution-tolerant snail. Moderate organic pollution is indicated.

Station #19

This station was located downstream from the Slash Run outfall, which is downstream from the P Street outfall in Washington, D. C. The bottom organisms consisted of three pollution tolerant genera and two intermediate genera. An intermediate midge with 390 organisms and sludgeworms with 71 were the dominant organisms out of the 480 organisms obtained in the square foot sample. Moderate organic pollution is indicated at this station. The source appears to be the Slash Run sewer.

Station #20

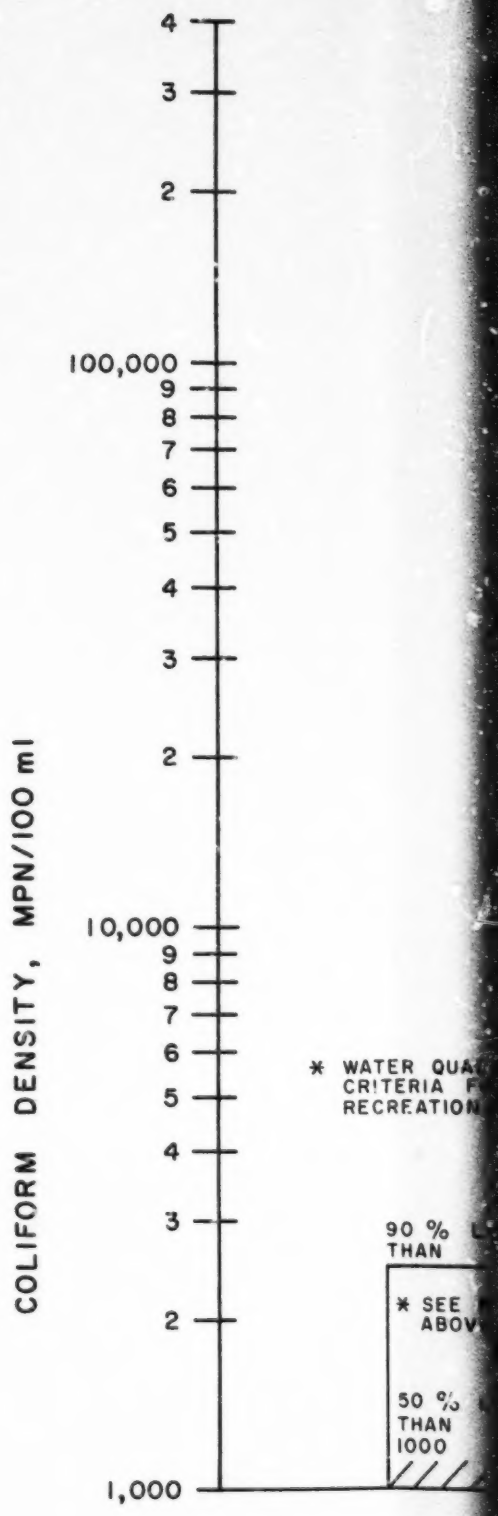
The last station on Rock Creek was located approximately 30 yards upstream from the mouth, near the canoe rental concession. The water was very turbid, and oil slicks were stirred up by our walking. After approximately 15 minutes of intensive searching, only one bloodworm could be found. A quantitative sample was not taken for this reason. Floating debris noted in the stream could have been washed up out of the Potomac, as this area is affected by the tide. Moderate-heavy organic pollution is suggested.

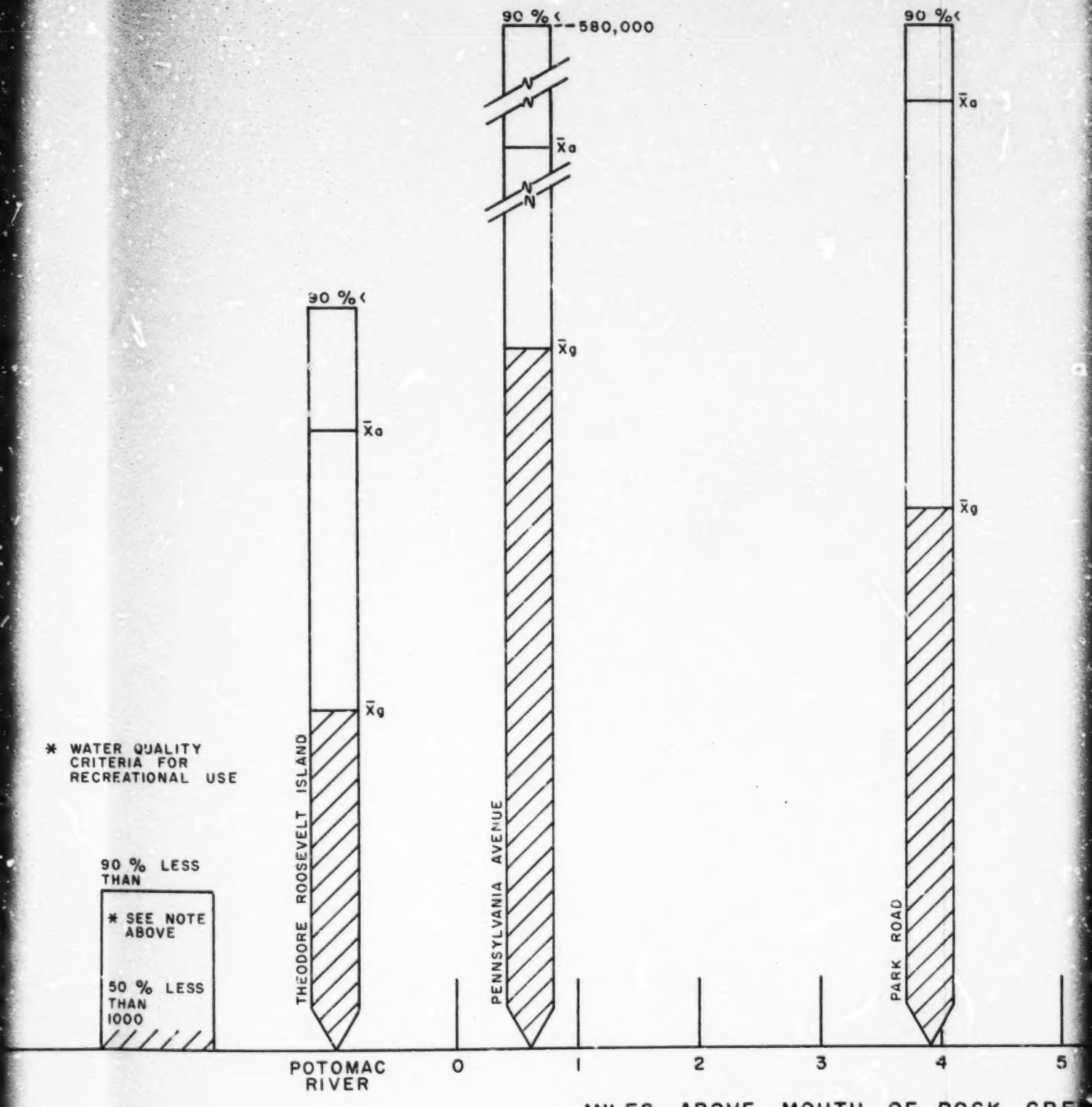
$\bar{X}_a$ = ARIT METIC MEAN

$\bar{X}_g$ = GEOMETRIC MEAN

90%< = MPN< INDICATED VALUE 90 % OF THE TIME

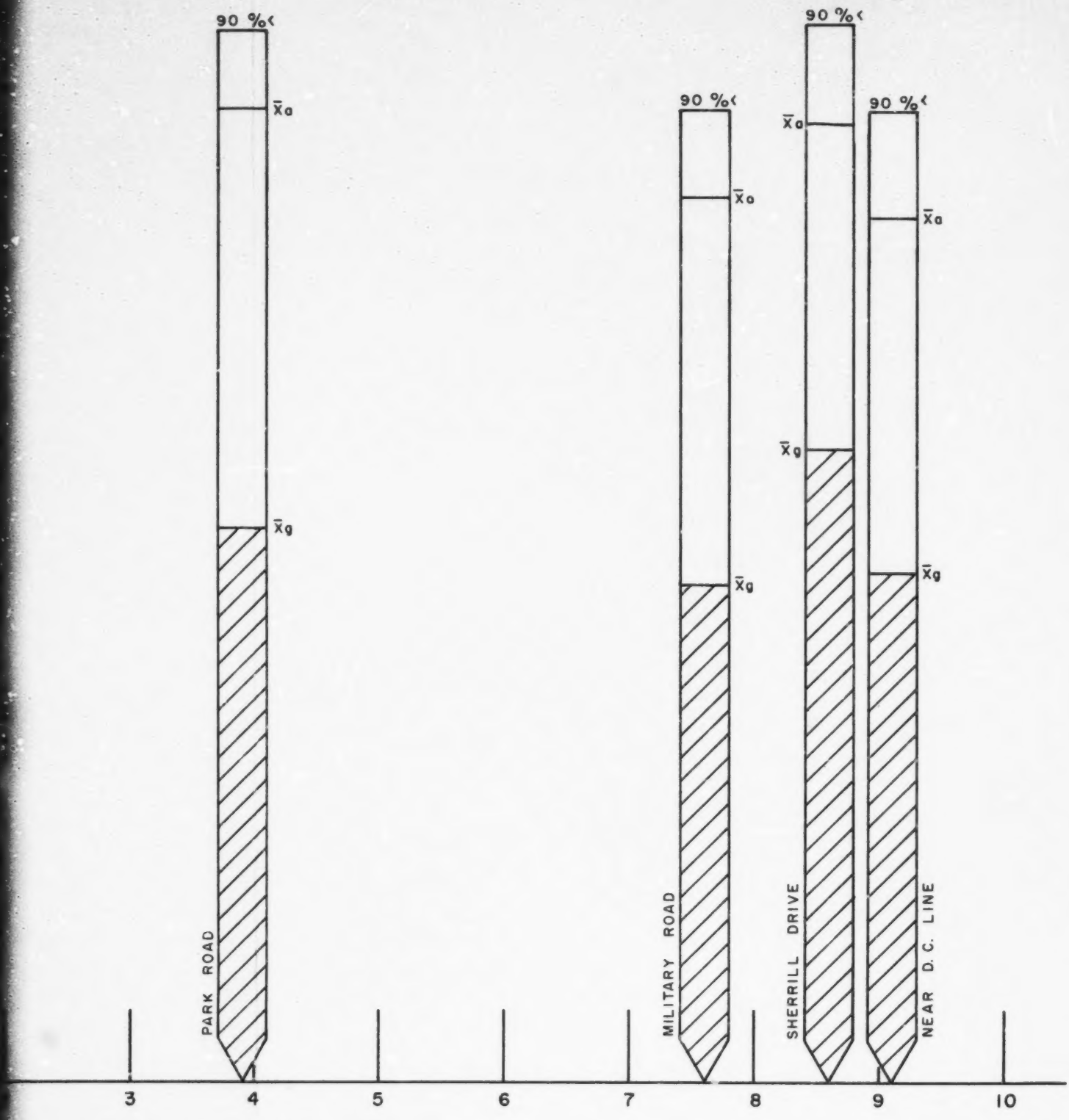
(PLANNING GOALS IN ACCORDANCE WITH REVISED PROJECT POTOMAC WATER QUALITY SUB-TASK FORCE REPORT OF NOV. 1, 1966)





ROCK CREEK

BACTERIAL QUALITY FOR 1965, FROM

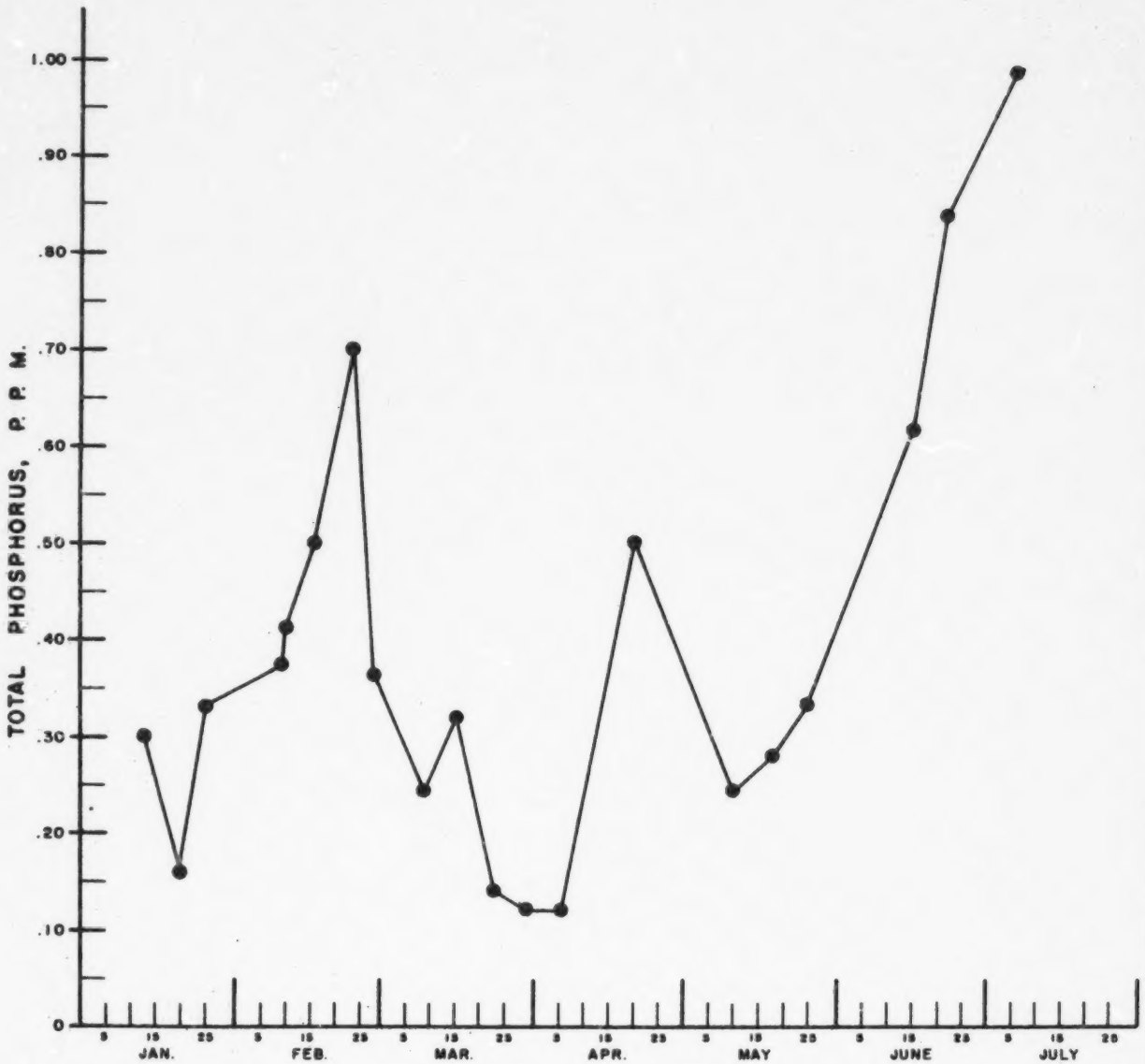


OVE MOUTH OF ROCK CREEK

ROCK CREEK

ALITY FOR 1965, FROM D.C. DATA

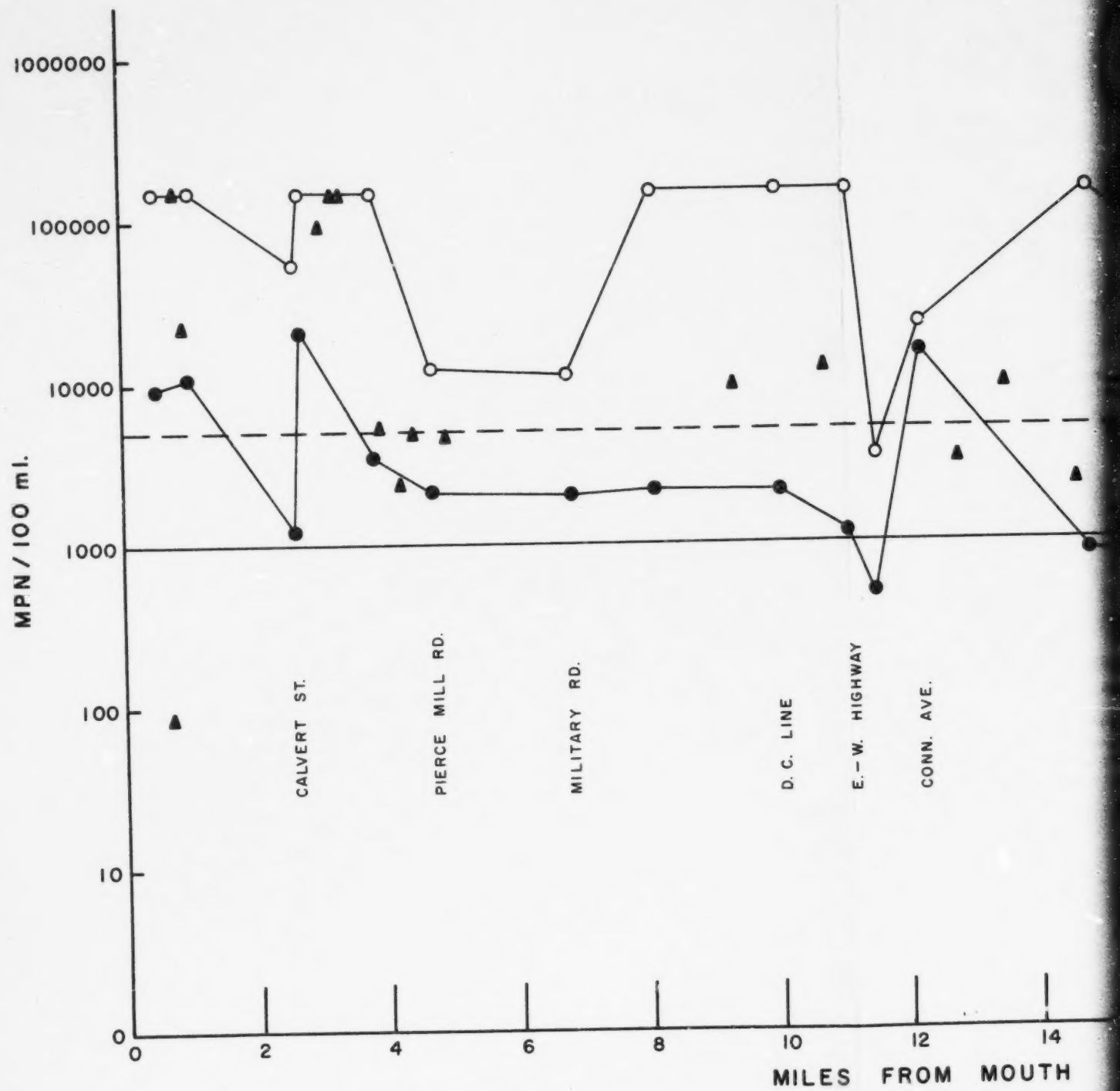
FIGURE 2



ROCK CREEK

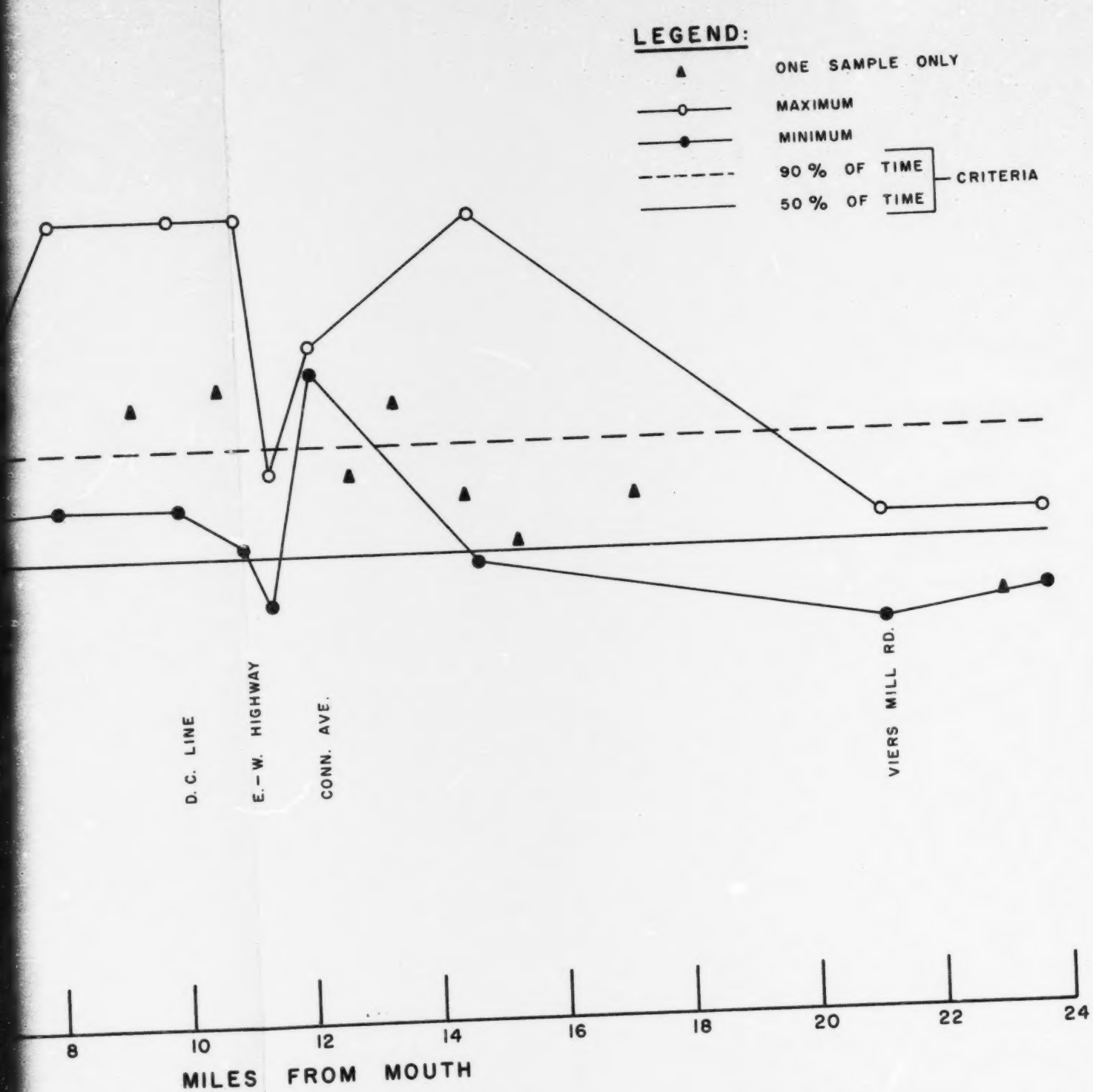
TOTAL PHOSPHORUS AT SHERRILL DRIVE, JAN. - JULY 1966

FIGURE 3.



ROCK CREEK

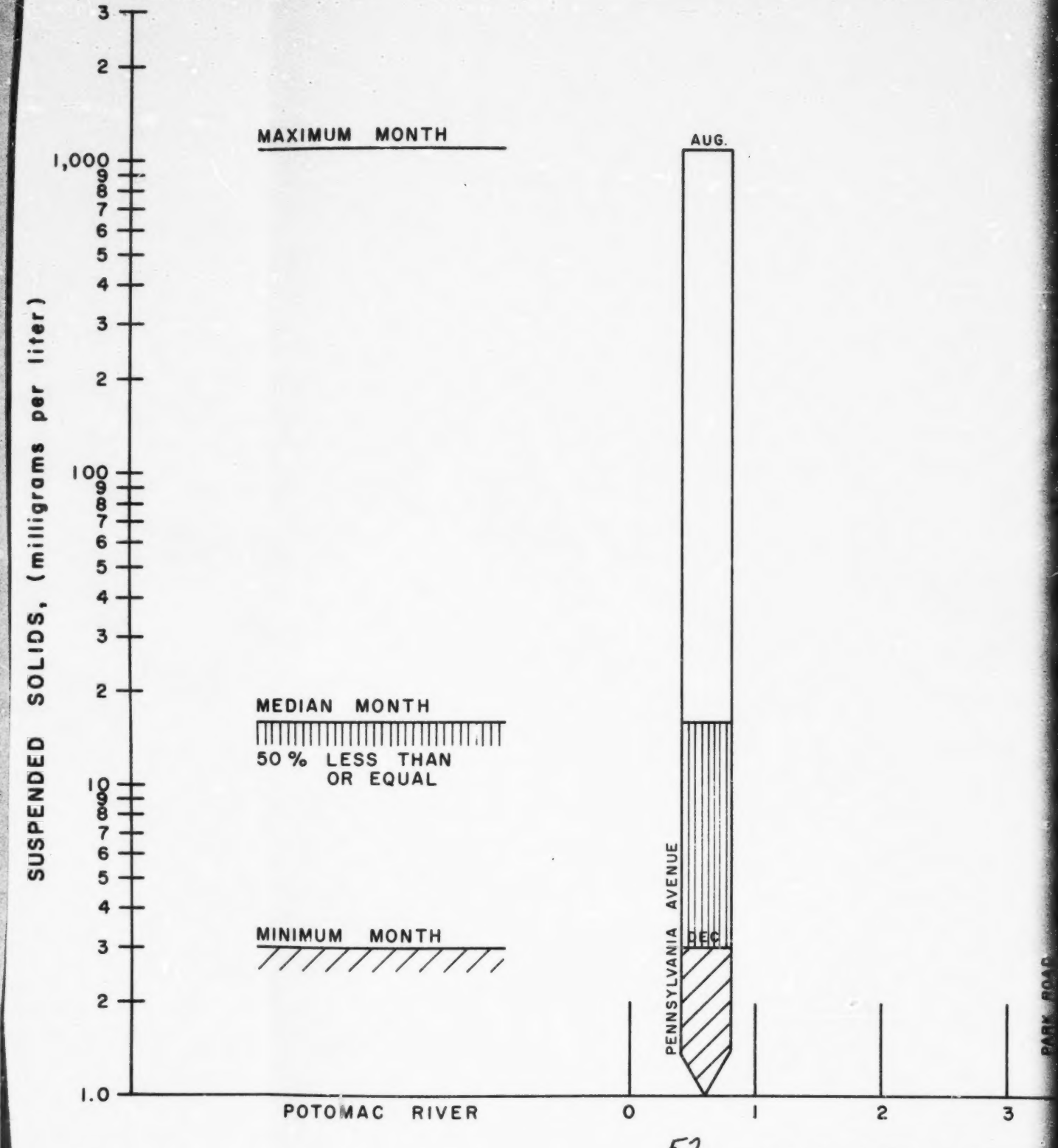
COLIFORM COUNTS, JUNE-AUGU



ROCK CREEK

COLIFORM COUNTS, JUNE-AUGUST 1966

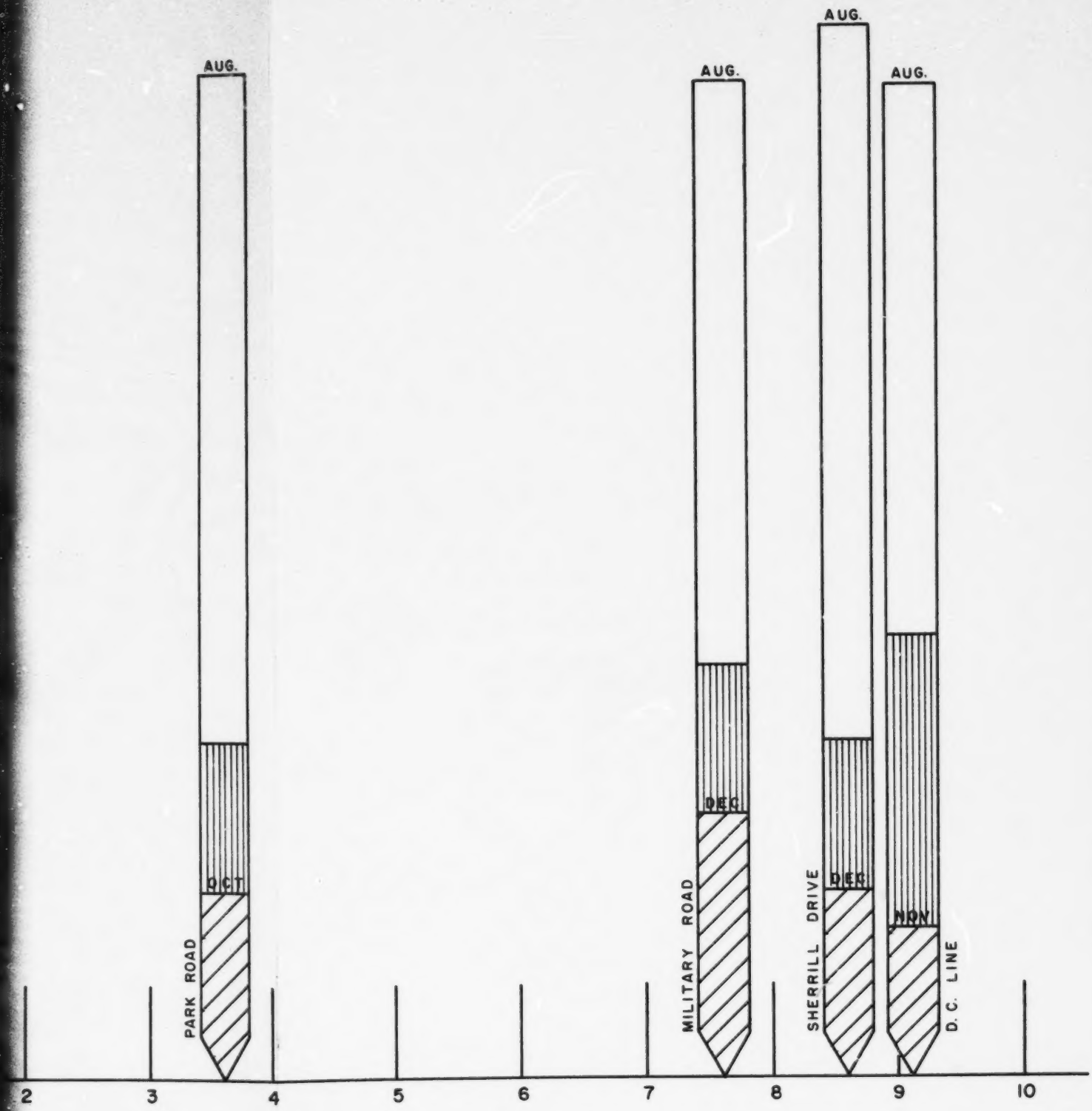
FIGURE 1



52

ROCK C

SUSPENDED SOLIDS FOR



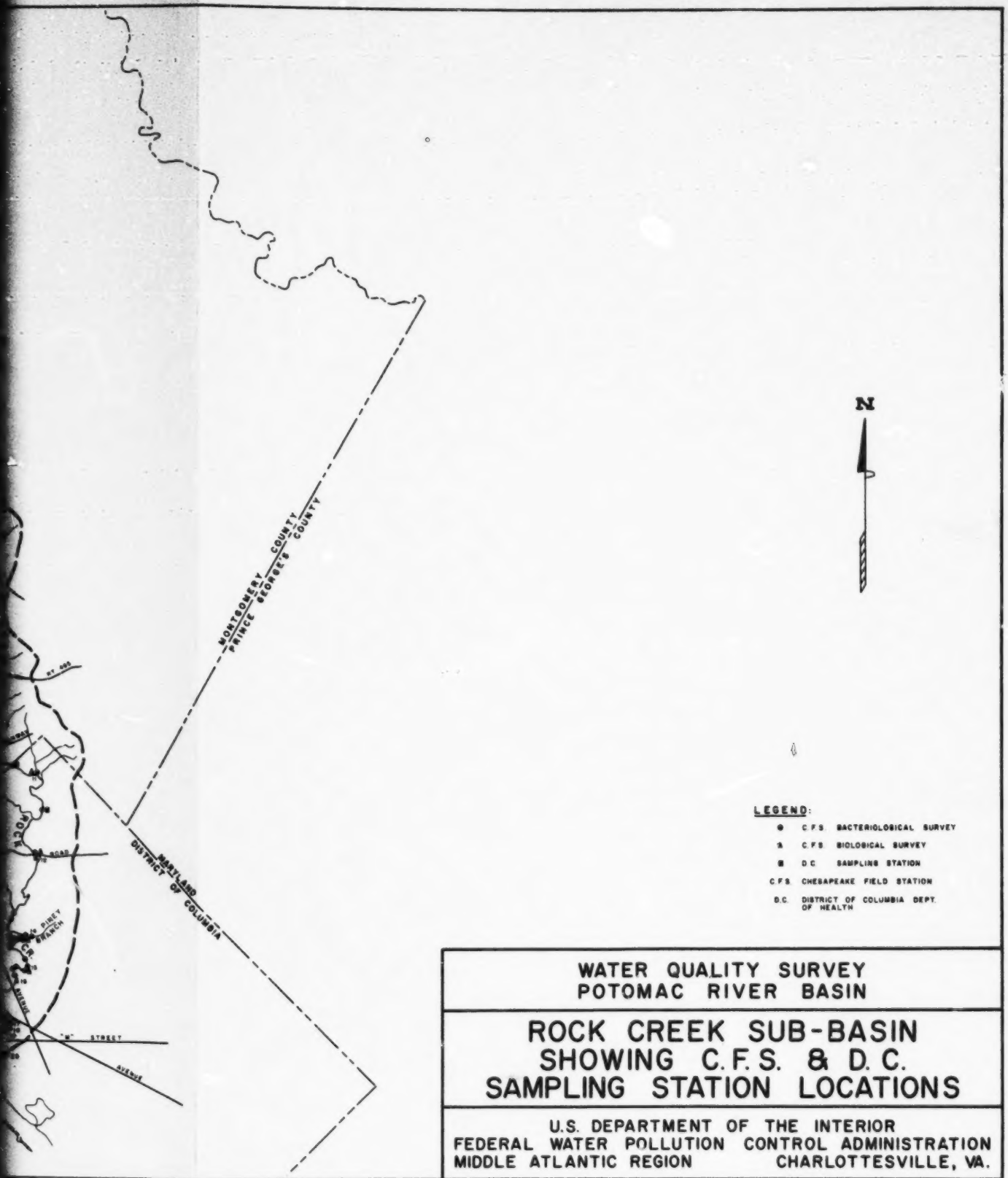
ABOVE MOUTH OF ROCK CREEK

ROCK CREEK

OLIDS FOR 1965, FROM D. C. DATA

FIGURE 4

ROCK CR.
N. BR. ROCK CR.
RT. 119
RT. 118
RT. 28
RT. 29
RT. 547
RT. 495
MILITARY ROAD
CEDAR LANE
COQUELIN CR.
EAST WEST HIGHWAY
POTOMAC RIVER
MARYLAND DISTRICT OF COLUMBIA
MASSACHUSETTS AVENUE
CONNECTICUT AVENUE
PINEY BRANCH CR.
"M" STREET
MONTGOMERY COUNTY
PRINCE GEORGE'S COUNTY
VIRGINIA
SCALE IN MILES
0 1/2 1 2 3 4



WATER QUALITY SURVEY
POTOMAC RIVER BASIN

ROCK CREEK SUB-BASIN SHOWING C.F.S. & D.C. SAMPLING STATION LOCATIONS

U.S. DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
MIDDLE ATLANTIC REGION CHARLOTTESVILLE, VA.

FIGURE 5